

Sampling plan. Geology

8908-15-45

PC7 NET7
Sp1 Plan

GEO 0815

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ORIGINAL
(Red)

GEOLOGY INFORMATION

The FMC Corporation Agriculture Chemical Group Site lies within the Atlantic Coastal Plain Province of Maryland. The Coastal Plain consists of unconsolidated sedimentary units, ranging in geologic age from Cretaceous to Recent, overlying Mesozoic age non-marine and Paleozoic age crystalline rocks. These southeastward dipping sedimentary units, which range in thickness from tens to hundreds of feet in the study area, consist of interbedded gravels, sands, silts, and clays. Areas are also covered by interglacial fluvial deposits of Quaternary (Pleistocene) age. In addition, there are exposures of Paleozoic age basement rock, primarily in the stream valleys. The study area has a dendritic drainage pattern. (1)

The majority of the site is underlain by the silt-clay facies of the Quaternary age Talbot Formation. This facies consists of buff to orange, poorly sorted, poorly bedded quartz silts with kaolinite, illite, and montmorillonite clays. The bedded silt deposits also contain very sparse leaf and twig debris. The silt and silty clays probably accumulated in alluvial flood plain-open marsh environments while the clays accumulated in estuarine environments. The Talbot Formation ranges in thickness from 1.6 to 32 feet. (1)

The western and southern fringes of the site is underlain by Quaternary age artificial fill. This unit consists of heterogeneous materials such as rock, unconsolidated sediment, slag, refuse and dredge spoil. Thickness of this unit ranges from 10 to 15 feet. (1,2)

Both of the previously mentioned units are underlain by the important water-bearing, Cretaceous age Patuxent Formation (called the Potomac Group? in the study area). (1) The Patuxent Formation (sand facies) consists of highly variable, interbedded sand, gravel, silt, and clay with hematite-limonite cement. The sands and gravels are typically quartzose with a buffy kaolinitic clay-silt matrix. These sediments are arranged into fining-upward packages that are 10 to 15 feet thick with planar-bedded gravels with clay clasts or cross-bedded sands at the base grading upward to laminate or massive silt-clay at the top. This formation, deposited in a high-gradient, braided stream complex, ranges in thickness from 7 to 115 feet. (2)

The soil beneath the site has not been mapped; however it is very likely it would have been classified as Urban land. Urban structures cover so much of this land type that identification of the soils is not practical. Most areas have been smoothed and the original soil material has been disturbed, filled over, or otherwise destroyed by construction. The soil would have a slow permeability and a pH that would be too variable to estimate. (3)

GROUNDWATER INFORMATION

The unconsolidated sediments that underlie the site have relatively uniform water-bearing properties and therefore function as one

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continuous hydrologic unit. The Quaternary deposits do not typically function as separate aquifers; they are much too thin and shallow to produce adequate quantities of water. These loosely compacted and irregular beds of sands and gravels have a high permeability which also allows surface water to easily percolate into and recharge the water-bearing zones that underlie them. Depending on the total thickness of the Talbot-Patuxent aquifer, coefficients of transmissibility of the sands range from less than 1,000 to more than 75,000 gallons per day (gpd) per foot. Wells completed in this aquifer can yield from at least 60 to 330 gallons per minute (gpm). (4)

The expected direction of shallow groundwater flow is to the east and south toward Stonehouse Cove and Curtis Bay. Flow direction is based upon topographic observations and the role of river as discharge points for groundwater.

1. Crowley, William P., et al., Maryland Geological Survey. Geologic Map of Baltimore County and City. 1976.
2. Reinhardt, Juergen and Crowley, William P., Maryland Department of Natural Resources, Maryland Geological Survey. Geologic Map of the Baltimore East Quadrangle, Maryland. 1979.
3. United States Department of Agriculture, Soil Conservation Service. Soil Survey of Baltimore County, Maryland. March, 1976.
4. Mack, Frederick K., Maryland Board of Natural Resources, Department of Geology, Mines and Water Resources. Ground-Water Supplies for Industrial and Urban Development in Anne Arundel County. 1962.